Program Announcement *NE –INERI-2001001*

International Nuclear Energy Research Initiative

AGENCY: United States (US) Department of Energy (DOE)
Office of Nuclear Energy, Science and Technology (NE)

ACTION: The US Department of Energy National Laboratories are invited to submit Field Work Proposals under the International Nuclear Energy Research Initiative for funding of collaborative projects with participants from the Republic of Korea in the development of advanced nuclear power systems.

SUMMARY:

The Office of Nuclear Energy, Science and Technology (NE), US Department of Energy (DOE), in cooperation with Ministry of Science and Technology (MOST) of the Republic of Korea (ROK) is interested in receiving Field Work Proposals (FWP's) for collaborative scientific and engineering research and development (R&D) with participants from the ROK in the field of nuclear energy under the International Nuclear Energy Research Initiative (I-NERI). The I-NERI program is designed to support innovative collaborative research on a bilateral basis to address the principal technical and scientific obstacles to future use of nuclear power world-wide.

DOE-NE authorized the I-NERI program to proceed with program development and planning activities in early US Fiscal Year 2001. The bilateral US/ROK collaborative R&D program to be established under this I-NERI solicitation is the first element of a broadly based international program to be established under bilateral and multilateral agreements with cooperating countries from around the globe.

A Memorandum of Understanding (MOU) between US-DOE and ROK Ministry of Science and Technology (MOST), dated June 14, 1996 as subsequently amended, constitutes the umbrella agreement for cooperative R&D between DOE and MOST in broad fields of study. The bilateral US/ROK I-NERI collaboration in nuclear energy development was formally authorized and initiated with the mutual approval by DOE and MOST of Annex V to the US/ROK MOU dated May 16, 2001.

This Program Announcement applies only to FWPs from DOE National Laboratories for US/ROK collaborations under I-NERI where the Laboratory is the lead US performing organization that will be responsible for the proposed work. Where DOE Laboratories are included secondarily in international collaborative arrangements with non-federal organizations, and not as lead performers, such joint proposals should be submitted in response to the separate, but equivalent Financial Assistance Solicitation Number DE-RPO6-RL-14333.

The FWP's for I-NERI grants under this solicitation must reflect collaborative arrangements for cooperative R&D involving at least one participant from the US and one participant from the ROK. The ROK participants will be funded under separate financial support from MOST. Participation of ROK parties in I-NERI will be invited through a separate, but equivalent solicitation being issued by MOST simultaneously with this Program Announcement. Collaborative arrangements may involve US and ROK federal and non-federal organizations, in lead roles and/or as subcontractors. The work scope and corresponding funding of all participants must be separately identified in the applications. A single proposal shall be submitted by the lead organization in response to this Program Announcement for each collaborative R&D project.

Dates: The deadline for receipt of the FWP's is *September 5, 2001.* Any proposals received after the deadline will not be considered for an award.

Address: All FWP's responding to this Program Announcement should be sent to Melanie P. Fletcher, US Department of Energy Richland Operations Office, 825 Jadwin, Richland WA 99352*,* Attention: Program Announcement DE- RP06-01RL14333.

An original and three copies of the FWP plus a 3.5 inch write-protected diskette containing the FWP *and separate cost proposal* in MS WORD format shall be submitted via the United States Postal Service including Express Mail, commercial mail delivery service, or hand carry by the proposer to the address stated above. FWP's will not be accepted by fax or electronic mail.

In addition, an original and three copies of the FWP plus a 3.5 inch write protected disk containing the FWP, *without the separate cost proposal,* in MS WORD Format shall be provided by September 5, 2001 to Dr. Jiyoung Park, Nuclear Technology Program, Korean Institute of Science & Technology Evaluation and Planning, 8F Dongwon Industry Building, 275, Yangjae-dong, Seocho-gu Seoul 137-130, Korea.

Eligibility: This Program Announcement invites FWPs from DOE national laboratories acting as the lead performing organization of a collaboration involving at least one ROK participant. PNNL is not eligible to participate in responses to this Program Announcement due to their role as Executive Agent for DOE.

Awards: It is anticipated that award selection will be made on or before October 31, 2001 with awards issued to the successful organizations before the end of calendar Year 2001. Field work proposals for projects with periods of performance of one to three years will be funded on an annual basis subject to the availability of funds and, where applicable, successful completion of previous phases. Up to a total of $2 million of US Government Fiscal Year 2001 Federal funds are expected to be available for awards to fund US research organizations under this Program Announcement and the complementary grants and cooperative agreements Solicitation. An approximately equivalent amount will be made available by MOST to ROK participants.

Any financial assistance awarded as a result of this Announcement shall be contingent upon the availability of appropriated funds. No legal liability on the part of the US Government for the payment of any money shall arise unless and until appropriated funds are made available to the Contracting Officer for these awards.

Typical DOE funding for collaborative research awards is expected to be in the range of $200,000 to $400,000 per project, per year for US participants. MOST will fund ROK participants for the selected project awards. It is intended that DOE and MOST will fund I-NERI in equivalent amounts on a program basis, but not necessarily on the individual project basis. Large collaborative research projects involving multiple US and ROK organizations may receive larger awards if merited. The period of performance for individual projects is expected to be one to three years.

DOE reserves the right to fund, in whole or in part, any, all, or none of the FWP's submitted in response to this Program Announcement, and will award the number of grants that serve the public purpose and are in the best interest of the US Government.

BACKGROUND:

In January 1997, the President of the United States requested his Committee of Advisors on Science and Technology (PCAST) to review the current national energy research and development (R&D) portfolio, and provide a strategy to insure the US has a program to address the Nation's energy and environmental needs for the next century. In its November 1997 report responding to this request, the PCAST Energy Research and Development Panel determined that assuring a viable nuclear energy option to help meet our future energy needs is important; and that a properly focused R&D effort should be implemented by DOE to address the principal obstacles to achieving this option, including issues involving nuclear waste, proliferation, economics, and safety.

In 1999, on the basis of the PCAST recommendations, DOE established the Nuclear Energy Research Initiative (NERI) to help overcome the principal technical and scientific issues affecting the future use of nuclear energy in the United States. NERI in Fiscal Years 1999 and 2000 made a total of 56 awards funded at a total of about $30M. Thirteen additional awards potentially totaling up to $16.6 M over 3 years were made in June 2001. Abstracts of the selected projects are provided on the NERI web page at http://neri.ne.doe.gov under the R&D Awards section. **Respondents are encouraged to refer to these abstracts in the preparation of new applications under the I-NERI program announcement to identify potential collaborations and to avoid duplication with on-going NERI research projects.**

Subsequently, in response to the *PCAST 1999 "Report on International Cooperation on Energy Innovation"*, DOE established the I-NERI program to promote bilateral and multilateral research. I-NERI is focused similarly to NERI on advanced technologies for improving the cost, safety, and proliferation resistance of nuclear energy systems, with

participation expanded to include international government and non-government participants world-wide.

I-NERI PROGRAM DESCRIPTION:

Goals & Objectives: The International Nuclear Energy Research Initiative (I-NERI) Program sponsors innovative scientific and engineering research and development (R&D), in bilateral or multilateral cooperation with participating countries, to address the key issues affecting the future of nuclear energy and its global deployment by improving cost performance, enhancing safety, and increasing proliferation resistance of future nuclear energy systems. In accomplishing this primary goal, the following objectives have been established for the I-NERI Program:

- Develop advanced concepts and scientific breakthroughs in nuclear energy and reactor technology to address and overcome the principal technical and scientific obstacles to the expanded use of nuclear energy worldwide

- Promote bilateral and multilateral collaboration with international agencies and research organizations to improve development of nuclear energy

- Promote and maintain nuclear science and engineering infrastructure to meet future technical challenges

R&D Approach: I-NERI provides an effective means for international collaboration on a leveraged, cost-shared *quid pro quo* basis. Actual cost-share amounts are determined for each project jointly selected. The program has a goal to achieve about a 50-50 matching contribution with each partner country at the program level, while exercising flexibility towards developing countries.

The network of international partnerships will result in well coordinated and cost-effective R&D that, in time, will provide the world with safe, proliferation resistant reactors that produce less waste and are more economical than the current generation of plants.

Program Control: A US/ROK Bilateral I-NERI Steering Committee (BINERIC), led by representatives from DOE and MOST, has identified specific research areas for mutually beneficial collaboration and will decide other bilateral cooperation issues, such as required agreements, eligibility for participation, project selection processes, joint funding structure, and contractual vehicles.

Project Selection: Proposals are solicited simultaneously in the United States and in the Republic of Korea Because funded projects are bilateral collaborative efforts, joint research teams are required to be formed to create integrated project proposals. Proposals will be formally reviewed and grants awarded on a merit basis to select the best potential collaborative projects that meet the solicitation criteria. Final decisions in

selection of high merit, mutually beneficial proposals are made by the BINERIC steering committee.

R&D Areas: For the DOE/MOST collaboration, the specific R&D areas identified by the BINERIC for the initial I-NERI solicitation were limited to just two, in recognition of limited budgets and desire of the parties to facilitate timely initiation of the program. The initial R&D areas for the current solicitation are:

- Advanced instrumentation, controls and diagnostics
- Advanced light water reactor technology

Because of the limited time and funds available for current awards, prospective applicants should exercise judgment in submitting only the most promising and important proposals that directly support the specified R&D areas as further discussed below. In formulating prospective projects, the current state of development in the areas to be investigated should be recognized to identify potential synergies and avoid repeating work already accomplished. In particular, research underway in ongoing NERI or other DOE projects should not be duplicated. Abstracts for current NERI projects may be found on the NERI web page: http://neri.ne.doe.gov under the R&D Awards section. Other DOE programs conducting nuclear energy and related research that should be considered when preparing a proposal include the Office of Science Basic Energy Sciences program and the Office of Nuclear Energy, Science and Technology Nuclear Engineering Education Research (NEER) grant program.

Scope of Work: In this solicitation, the parties are seeking applications for new and innovative collaborative R&D under the DOE/MOST Collaborative I-NERI Agreement. Proposed work is expected to contribute significantly to meeting the I-NERI objectives in the specific R&D areas and work elements as follow;

Advanced Instrumentation, Controls, and Diagnostics: This R&D area includes the investigation, development, and verification of advanced instrumentation, controls, and diagnostic tools for reactor and power conversion systems that offer the prospect of improved performance and operation, design simplification, enhanced safety, and reduced overall cost. Proposed projects may involve innovative systems, components, and computational approaches for improving the monitoring, assessment, and control of nuclear reactor and power system operations. Work elements in this R&D area include, the following:

- Advanced digital instrumentation and controls
- Software validation and verification
- Advanced condition monitoring of components and systems

Advanced Light Water Reactor Technology: This R&D area includes the investigation and preliminary development of advanced concepts, technologies, and materials that offer prospects for improved performance and operation, design simplification, enhanced safety, reduced waste production, and reduced overall cost of

light water reactor and power conversion systems. Proposed projects may involve the following R&D areas:

- Advanced materials (fuel, cladding, and reactor structures)
- Advanced fuel technology (high burnup, thorium, particle fuels)
- Innovative safety research
- Advanced computational methods (seismic, thermal-hydraulic, reactor physics)

COLLABORATIVE FWP REQUIREMENTS:

International collaboration involving at least one participant organization from the US and one from the ROK is required on I-NERI projects. Collaborative proposals involving more than one US organization and more than one ROK organization are allowed, providing there is a minimum of one US and one ROK organization. Under this Program Announcement, collaborative FWPs should identify the national laboratory as the lead organization, the ROK lead and participating organizations, and the individual work scope responsibilities and costs for each US and ROK participant. The lead DOE national laboratory should submit a single FWP, which integrates the overall project work scope assigned to each participant.

For successful FWPs, the lead DOE national laboratory will be funded directly by DOE, and the lead Lab will fund other US non-federal participants via subcontract or other arrangements. The private sector or academic organizations must include a Standard Face Page (form 424) and Budget Pages (form DOE F.4620.1) for their portions of the project in the FWP. Separate Budget Pages must be included for the DOE national laboratory portions. A Standard Face Page should be provided by the national laboratory for the complete package showing the total cost and individual collaborator costs for each year of the project. All costs should be specified for each year on an elapsed time basis, and not a fiscal year basis. The collaborative FWP must be submitted as one package.

Collaboration with international organizations requires all DOE funding to be used for work performed by the US participants. Such collaborative arrangements are subject to approval by DOE and must comply with any Federal restrictions on foreign participation, and with any current DOE memoranda of understanding or other general agreements between DOE and the participating foreign entity.

FORMAT AND INFORMATION TO BE INCLUDED IN THE APPLICATION:

Applications in response to this solicitation shall include a technical proposal and separate cost proposals in accordance with the following requirements.

Since business sensitive information may be included in cost proposals, DOE and MOST should only receive detailed cost proposals from their respective organizations. US organizations participating as the lead or as a collaborator on a project shall submit a cost proposal only to DOE. Similarly, Korean organizations participating as the lead

or as a collaborator on a project shall submit cost proposals only to MOST in accordance with Korean requirements. Project summary level budget information for each organization shall be included in the technical proposal as stated below.

General Requirements:

- Application shall be written in English;
- Budgets should be expressed in US dollars, specified for each year of the project on an elapsed time basis, and not a fiscal year basis;
- Applications should clearly present the objectives, work scope including tasks to be performed, key milestones for each year, schedule, costs, and the importance/significance of the proposed project;
- The individual responsibilities of participating organizations should be clearly identified in the proposal work scope tasks.

Technical proposal requirements:

- Standard Face Page *(DOE Form 424)*;
- Table of Contents;
- Project Abstract;
- Project Description - narrative description of the proposed project including objectives, background, R&D plan including an itemized work plan showing individual tasks and responsible organizations, and a statement describing the importance of proposed project (no more than 20 pages);
- Project Schedule and Milestones, including key milestones at the end of each budget year (based on a 12 month interval, not on a fiscal year basis);
- R&D Collaboration - description of the collaborative arrangements between participating organizations defining general responsibilities and tasks assigned to each participating organization (up to 2 pages);
- Organization & Qualifications - identification of the project organization, and qualifications and responsibilities of the participating organizations. US and ROK lead organizations and project managers/principal investigators must be identified; Biographical sketches of the project manager/principal investigators and other key project personnel shall be included (no more than 2 pages each);
- Facilities & Resources - information on the experience of the applicant organization and the adequacy of required facilities and resources (no more than 3 pages);
- Project Summary Budget – Project summary budget table defining total and individual funding requirements for each participating organization by major task, for each year, and total project period. Annual periods shall be based on a 12 month elapsed period rather than on fiscal year basis;
- Where applicable, a written statement that to the best of the lead applicant's knowledge, the effort performed by a collaborating DOE national laboratory will not place the laboratory in direct competition with the domestic private sector.

Cost Proposal Requirements:

The following cost proposal requirements are intended for US organizations responding to the solicitation as a lead or collaborating organization on an I-NERI project.

- DOE laboratories provide the standard Field Work Proposal face page *(DOE form BUD 11A&B)* and detail attachments as required;
- All other US proposers provide the Standard Face Page *(DOE Form 424)* with the project title and Cost proposal identification;
- Project Summary identifying the organizations involved and a short general description of each organization's role;
- Detailed budgets and supporting information shall be submitted for each participating US organization using DOE form F.4620.1. Budget forms shall be submitted for each year and for the total project period; total budget for each year and total project period; all annual budgets should be based on 12 months elapsed time and not on a fiscal year basis. These budget forms should support the funding summary information provided in the Technical Proposal.

Required forms can be accessed through the Richland Operations Office Procurement website at http://www.hanford.gov/procure/pro.htm

In addition to providing an original and three copies of each FWP, proposers are required to provide a 3.5-inch write protected diskette containing the FWP in MS WORD format. The label on the diskette must clearly identify the institution, principal investigator, title of the FWP, and the computer system and program used to prepare the document. Unsuccessful FWP's will not be returned to the proposer.

FIELD WORK PROPOSAL REVIEW PROCESS: All valid FWP's will be evaluated in accordance with the requirements of Title 10, Code of Federal Regulations (CFR), Part 600.13

DOE will perform an initial screening of the FWP's for conformance with the technical and administrative requirements stated in this announcement, and for general relevance to I-NERI program objectives. FWPs determined not to be in conformance with the solicitation requirements, particularly the work scope section, will be removed from further consideration.

- For those FWP's that successfully complete the initial screening, a peer review will be performed to evaluate technical and/or scientific merit, and cost aspects of the proposals, exclusive of NE programmatic and policy factors. The peer review will be done in accordance with guidelines approved by DOE. The peer review will evaluate the proposals in accordance with the evaluation criteria stated below. For this purpose, three or more professionally and technically qualified persons of equal number from the US and ROK will be selected in such a manner as to assure the highest degree of independence and objectivity. The reviewers may include any mix of federal and non-federal experts, except those persons involved in approving/disapproving the award selections. Reviewers must comply with the standards of conduct as stated in 10 CFR 1010.

- A parallel screening and peer review of the applications will be conducted by MOST by their applicable procedures.

- Following the DOE/MOST peer reviews, a joint programmatic-relevance review will be performed by the BINERIC steering committee for those proposals judged to be of the highest merit. The FWPs will be evaluated with respect to applicable NE and MOST programmatic and policy factors, including relevance of the proposed work to I-NERI program objectives, balance among program elements to be supported, availability of funds, conformance to DOE/MOST policies and programmatic objectives. The BINERIC Steering Committee will make the final selection of proposals for I-NERI awards.

EVALUATION CRITERIA: The following evaluation criteria and the associated weighting factors (in parentheses) apply to the objective merit review:

- Merits of technical approach (40%)
- Degree of innovation and uniqueness of the proposed research (15%)
- Qualifications of investigators (15%)
- Adequacy of facilities and equipment to be used in the proposed research (15%)
- Apparent adequacy and reasonableness of cost and schedule (15%)

INTELLECTUAL PROPERTY RIGHTS: With respect to intellectual property, the patent and data provisions set forth in the national laboratories M&O contract shall be used.

Management of intellectual property rights under the I-NERI program is also subject to the terms and conditions of Annex 1 to the Memorandum of Understanding (MOU), which provides the umbrella agreement for cooperative R&D between DOE and MOST

STATUTORY AND REGULATORY AUTHORITY: The International Nuclear Energy Research Initiative (I-NERI) program will be conducted under the authority of the Energy and Water Development Appropriations Act of 2001. The Catalog of Federal Domestic Assistance (CFDA) number is 81.121 and the applicable DOE Financial Assistance Regulations, 10 CFR Part 600, also apply. The regulations and guidance documents can be accessed on the DOE Financial Assistance Home Page at: http://www.pr.doe.gov/fahome.html

PROGRAM ANNOUNCEMENT QUESTIONS & ANSWERS: A pre-proposal conference will not be held by DOE. Written questions may be submitted via e-mail to Melanie_P_Fletcher@rl.gov by July 27, 2001. Responses to questions will be periodically placed on the Richland Operations Office Procurement Web Site at http://www.hanford.gov/procure/pro.htm.

PROPOSAL PREPARATION COSTS: This program announcement does not obligate the Government to pay any costs incurred in the preparation and submission of pre-proposals or proposals, or for making necessary studies or designs for the preparation thereof or to acquire or contract for any services.

FOR FURTHER INFORMATION CONTACT:

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This solicitation will be published on the Richland Operations Office Procurement Web Site at: http://www.Hanford.gov/procure/pro.htm on or about July 2, 2001.